

the mass of communications constantly received there was so confusing, that at length he resolved to judge by personal inspection,—and he had spent much time in visiting the different localities and seeing the sewers for himself. As to pipes, he would not touch one. He hated the very name of them, and felt inclined never to mention the word again. Mr. Rawlinson had stated that he fully expected to see the Legislature ultimately pass an Act to forbid men going into sewers, just as they had already forbidden boys going up chimneys. Now, he thought that there was no comparing the two subjects. In the one instance, persons were prevented from making boys go up chimneys, whereas, in the other case, men who voluntarily followed the occupation were free agents, and were not compelled by any one to go into the sewers. Besides, there were numerous callings rendered necessary by the wants of society which were injurious to health, and far more injurious, it should be remembered, than going down into the sewers, and which it would be folly to suggest should be forbidden by statutory enactment. The danger, moreover, might be in most instances overcome or avoided by engineers, by means of ventilation, &c. He next called attention to the failure of pipes in the St. Giles's district, quoting a report thereon to the Sewers Commission, signed by their secretary, Mr. Woolrych; and proceeded to point out how inappropriate and ineffectual pipe drainage would be in Bermondsey, for example, where the sewers were below high-water mark, and were stopped sixteen hours out of the twenty-four. He would not, in fact, use pipes, for they do not afford any facilities for repair. No sewers ought to be constructed that men could not go up, to inspect and discover at once the spot where any cause of stoppage or other source of failure existed. No fallacy was greater than the delusion that the velocity was greater in small pipes than in sewers of greater size.

Mr. Bidder advocated the use of sound bricks for sewers, not hollow bricks. He quite agreed that the drainage of a town should be an enduring work; but he did not believe that pipes would prove lasting. There could be no question that the healthiness of a district was increased by drainage. That was no recent discovery; but the benefit was shown in young lives, and was almost inappreciable after sixty or seventy years of age. Mr. Roe's tables had been attacked during that discussion; but he had heard that the General Board of Health had paid a large sum of money to become possessed of these tables, and he thought it was much to their credit that they had done so, and published them for the benefit of the country.

Mr. Newland said that he had had considerable experience at Liverpool; and he had always regarded it as the first object to get rid of the sewage, and to have main sewers that admitted of inspection, in case of stoppages or accidents. It was also a great object to cut off the upper waters, and to prevent them from getting down into the lower levels. In the course of draining Liverpool he had laid down some forty miles of pipes as street sewers and yard and house drains, and he had found them work well.

Mr. Simpson said that sixteen years ago he had laid down a 2-feet iron pipe for drainage purposes, one mile in length, and he had never heard of any failure or stoppages in that sewer. He thought, however, that local circumstances must greatly guide the engineer in deciding upon the drainage of any district, and materially influence him in adopting the material of which the drains should be constructed. He thought also that there ought to be means of inspecting the drains to discover any causes of stoppage.

After some conversation, during which Mr. Haywood said that he had, for the sake of experiment, ceased flushing some pipe sewers and drains which had always previously been flushed, and he found that, since Midsummer, there had accumulated in them one inch of deposit,—

Mr. Rawlinson replied, and stated that flood-

ings were not the result of pipe drains alone, but that they also took place where large sewers were laid. He denied that with pipe drainage there were no means of discovering where stoppages occurred, and how they arose. By a careful examination of the state of the loose drains on either side of the sewer, the precise spot might easily and speedily be found where the obstruction arose. There had been few failures in the pipe drains laid on the Surrey side of the metropolis, and there the system he advocated had been carried to the greatest extent and worked well. Still, he repeated, local circumstances must always weigh powerfully with the engineer in deciding on any scheme of drains for a district. The advantages of improved drainage would, indeed, he contended, be immense. Improved drainage would give the advantages of equal for unequal and intermittent working of the sewers: it would give quick flow instead of a slow flow; it would substitute circulation for stagnation; it would give short lines and good falls for long lines and bad falls. Pipes for the purposes of drainage would present smooth surfaces instead of rough ones; impervious structures instead of permeable ones; few joints instead of many. In conclusion, he remarked that a gentleman who had opposed pipe drainage (Mr. Hawksley) had, however, recommended them for the drainage of the city of Durham—a curious contradiction to his arguments during the present discussion.

Mr. Hawksley said, that there were local circumstances in that place which admitted of their being used, when they would otherwise have been inapplicable. But even there, he had proposed to introduce them to a greater extent than he should otherwise have done, owing to his conviction that the General Board of Health would not, under other circumstances, have given the requisite sanction for obtaining the money required to carry out the works in question.

Mr. Rawlinson was surprised to hear such a reason given for an engineer departing from his own convictions, and recommending works in which he had not full confidence. Nothing should induce an engineer to yield his own opinions in such a matter; and he could not understand any one reconciling it to his conscience, to lay down in practice what was opposed to his convictions.

This is a brief and imperfect, but we have every reason to believe a faithful outline of this lengthened discussion, in which many of the speakers departed widely from the main question, and several showed a degree of "feeling" on the subject, which would have seemed extraordinary to any not acquainted with previous events.

Some who advocated the new views on drainage attacked, in the first instance, indiscriminately and unwisely, professional men: the professional men, when an opportunity offers, are anxious to return the compliment, and so poor Truth, whom both sides are really and seriously looking for, gets shuffled about, and hidden in the encounter,—hidden, however, we may be quite certain, only for a time, and to shorten that time is our earnest desire.

**ROLLING METALS WEDGE FORM.**—A patent has been applied for, under the new Act, by Richard Prosser, C.E. Birmingham. The specification states, that the improvement consists in rolling bars of metal, of a wedge form,—that is, leaving one end thicker than the other, or one edge thicker than the other. Two wedge-shaped ingots are taken and superposed one on the other, the thick end of the one being against the thin end of the other, and thus placed they are submitted to the action of the rollers. When the bars are required to have all surfaces smooth, the two ingots or bars are to be withdrawn from contact, and placed so that what was the inner surface becomes the outer.

## THE ALLEGED DISCOVERY OF THE CONSTRUCTIONAL LAWS OF MEDIEVAL CHURCH ARCHITECTURE.

THE following are the remarks made by Dr. Henszmann, at a meeting of the Institute of British Architects, on the 6th inst.:

There is a striking difference between the effect produced by a church or any other structure deriving its origin from the Middle Ages, and by the buildings of the same style erected in modern times; and as the details of the latter are, in most cases, nothing but strict imitations of mediæval ornaments, the cause of this difference must lie deeper than the ornamental surface: in fact, a somewhat experienced eye will, at least, guess, if not exactly ascertain the fact, from the delightful impression produced by every mediæval building, that there must be a strictly defined law upon which its harmony depends.

It is this harmony which was sought for as far back as the end of the fifteenth century by Mathias Roritzer, an architect of Nuremberg, who wrote a pamphlet on the construction of pinnacles,—"Von der Fialengefichtigkeit,"—translated several times into the English and French languages: it is this harmony, the search for which we meet in other books published in the sixteenth century and later.—It is this very harmony that was sought for by Boissier, Sieglis, Hofstätt, Cockerell, Helling, Pupp, Griffiths, Cesariano, Kallenbach, Heidehoff, and other authors on mediæval architecture. Nevertheless, all these writers failed in the attempt, from not considering that the effect of harmony can never be produced in an arbitrary way, but that, on the contrary, it can only be derived by an organic process, in which every larger feature or system of construction engenders the dependant smaller features, and in consequence of which organic process every system (for instance, that of shafts or buttresses), is once more dependant, not only on the principal unity, but also on the relation in which the single systems stand to each other.

A similar law of harmony exists in music. The principles of it being called thorough bass: this latter is known, and (notwithstanding we do not adhere strictly to the natural musical system), has attained a high degree of perfection, whilst the science of architectural harmony flourishing in the middle ages is entirely lost, and for a long time only its former existence has been recorded by a latter product bearing testimony to its dark origin. I mean Freemasonry, which in course of time has taken an entirely different path than that indicated by its very name.

It is true that the human ear has a much more accurately discerning sense than the eye; nevertheless, it is ascertained by the laws of optics, and of linear perspective, and by the obvious harmony of buildings of ancient times, that there is and must be in the human eye a similar discerning power, and a similar mathematical basis, from which the delightful feeling to the mind arises, when it becomes aware of harmony through the medium of the eye. A striking proof of this coincidence or identity of the laws of hearing and seeing, is given in the works published upon these subjects by Mr. Hay, of Edinburgh.

Having become long ago firmly persuaded of the truth of the above statement, I applied myself to the study of the Constructional Laws of Ancient Church Architecture, and after having consecrated many a year to painful toil, hail at length the good fortune to rediscover them in their full extent. And this I can assert with propriety, because these laws are founded on mathematics, and I am able to prove them to be correct with the same certainty as any mathematical truth can be proved.

This assertion may seem rather improbable to those who think that the architects of the middle ages cared little for numbers, and who are aware that algebra, in its higher branches, is a comparatively modern science. To these objections I reply, that the architects of old did not employ much reckoning in their constructions, but they used geometrical forms; and as geometrical forms can be resolved in numbers or mathematical forms, whoever